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EXAMINER	
ROSARIO VASQUEZ, DENNIS	
ART UNIT	**PAPER NUMBER**
2621	

DATE MAILED: 01/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/879,343	GALLAGHER ET AL.	
	Examiner	Art Unit	
	Dennis Rosario-Vasquez	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *Amend: 08/08/2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 June 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The amendment was entered on August 8, 2004 and made of record. Currently claims 1-29 are pending.

Claim Objections

2. Due to the amendment the objection to claim 13 is withdrawn.

Response to Arguments

3. Applicant's arguments filed August 8, 2004 on pages 7-9 with respect to claim 1 have been fully considered but they are not persuasive.

The amendment states, " In the present case, however, Rueman does not teach the element in amended Claim 1... of "b) generating a noise metric from the noise table, said noise metric representing the noise appearance in the image *as seen by a human observer*."

However, Rueman does teach the element in amended claim 1 of generating a noise metric ("updated spatial device profile" for a particular image acquisition device at col. 5, lines 53-58 and shown in figure 1, num. 12: UPDATE THE SELCTED DEFAULT INFORMATION. Note that the updated spatial device profile or "tags" in col. 5, lines 53,54,58 and 59 includes noise information.) from the noise table ("generation of look-up tables [or LUT] of noise" at col. 4, lines 18-26 and shown in fig. 2A, num. 36:FORM LUT Ly BY INTERPOLATION. Note that the process of fig. 2A, num. 36 is shown in figure 1, num. 10:GENERATE IMAGE NOISE CHARACTERISTICS FROM USER KNOWLEDGE AND IMAGE DATA.), said noise metric (figure 1, num. 12: UPDATE THE SELCTED DEFAULT INFORMATION) representing the noise appearance in the image as seen by a human observer (Figure 1, num. 12: UPDATE THE SELCTED DEFAULT INFORMATION uses the tags that include noise information queries in col. 5, line 39 such as "was the image previously sharpened... [and resized]" in col. 5, lines 44-46 as seen or "known" in col. 5, line 39-41 by a "user" in col. 5, line 43.).

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-12,14,16,18,19-28 are rejected under 35 U.S.C. 102(b) as being anticipated by Reuman (US Patent 6,069,982 A).

Regarding claim 1, Ruman discloses a method for estimating the noise appearance in an image (In the title.), comprising the steps of:

a) forming a noise table ("generation of look-up tables [or LUT] of noise" at col. 4, lines 18-26) representing noise magnitude vs. intensity ("gray-level-dependency of the noise" at col. 4, line 24,25.) of the image ("subject image" in col. 4, line 26.); and

b) generating a noise metric ("updated spatial device profile" for a particular image acquisition device at col. 5, lines 53-58 and shown in figure 1, num. 12: UPDATE THE SELCTED DEFAULT INFORMATION. Note that the updated spatial device profile or "tags" in col. 5, lines 53,54,58 and 59 includes noise information.) from the noise table ("generation of look-up tables [or LUT] of noise" at col. 4, lines 18-26 and shown in fig. 2A, num. 36:FORM LUT Ly BY INTERPOLATION. Note that the process of fig. 2A, num. 36 is shown in figure 1, num. 10:GENERATE IMAGE NOISE CHARACTERISTICS FROM USER KNOWLEDGE AND IMAGE DATA.), said noise metric (figure 1, num. 12: UPDATE THE SELCTED DEFAULT INFORMATION) representing the noise appearance in the image as seen by a human observer (Figure 1, num. 12: UPDATE THE SELCTED DEFAULT INFORMATION uses the tags that include noise information queries in col. 5, line 39 such as "was the image previously sharpened... [and resized]" in col. 5, lines 44-46 as seen or "known" in col. 5, line 39-41 by a "user" in col. 5, line 43.).

Regarding claim 2, Ruman discloses the method claimed in claim 1, wherein the step of forming a noise table includes the steps of:

a1) forming an input noise table representing noise magnitude vs. intensity of an input image (Addressed above.);

a2) providing an image processing chain including one or more image transforms (Reuman's system queries a user for information related to the image's source, such as whether the image was compressed and decompressed, resized, and sharpened; and the system uses the data within the image to select the appropriate tags at col. 5, lines 39-53.);

a3) determining an appropriate noise transform ("spatial profile tags" are selected based on the data embedded within the image at col. 5, lines 48-50.) defining the effect that each image transform or embedded data will have on the noise in the image; and

a4) applying the one or more noise transforms to the input noise table to produce the noise table representing an estimate of the noise in the image (Reuman states,"...the updated tags include noise LUT information...(col. 5, lines 58,59).")

Regarding claim 3, Reuman discloses the method claimed in claim 2, wherein one of the transform steps is a digital image processing step ("digital image" at col. 6, line 10.)

Regarding claim 4, Reuman discloses the method claimed in claim 2, wherein one of the transform steps is an image rendering step ("interpolated up or down" at col. 5, line 46).

Regarding claim 5, Reuman discloses the method claimed in claim 2, wherein one of the transform steps is human visual perception (A "video camcorder" can be used by a human or "user" at col. 5, lines 41-43.).

Regarding claim 6, Reuman The method claimed in claim 2, wherein the input noise table represents the noise in a digital image produced by scanning a photographic film image ("noise introduced by the scanner" at col. 4, lines 43,44).

Regarding claim 7, Reuman discloses the method claimed in claim 2, wherein the input noise table represent the noise in a digital image("data embedded in the image...affects the...tags" at col. 5, lines 48,49.) produced by an image sensor(scanner of claim 6).

Regarding claim 8, Reuman discloses the method claimed in claim 2, wherein the input noise table represents the noise in a photographic film image ("camcorder" at col. 5, line 43.).

Regarding claim 9, Reuman discloses the method claimed in claim 1, further comprising the step of weighting the noise table by a weighting function ("coefficients" are use within the LUT generation step at col. 9, line 52 .

Regarding claim 10, Reuman discloses the method claimed in claim 9, wherein the weighting function represents a histogram of the image (The coefficients b0 and b1 are created in step 44 of figure 2A from a histogram created in step 27 of fig. 2A (col. 9, lines 39 and 52.).

Regarding claim 11, Reuman discloses the method claimed in claim 1, wherein the noise table is formed as a function of intensities in the image (Reuman states," LUT information relating to noise variance values at particular grey-levels...(col. 5, lines 59,60).")

Regarding claim 12, Reuman discloses the method claimed in claim 1, wherein the step of generating a noise metric includes the step of locating the peak value ("maximum noise" at low and high grey levels at col. 7, lines 53 and 55) of the noise table to obtain the noise metric.

Regarding claim 14, Reuman discloses the method claimed in claim 1, wherein the step of generating the noise metric includes the step of performing a summation (col. 9, lines 54,55 is a formula "L'(y)" with a summation for all grey levels at step 46:"GENERATE LUT L'y" of figure 2A) of the output noise table to obtain the noise metric.

Regarding claim 16, Reuman discloses the method claimed in claim 2, further comprising the steps of:

forming a predetermined input noise table for a specific image capture process (Reuman states," In FIG. 1, box 2 queries whether full knowledge associated with selected tags of a spatial device profile of the image is available (col. 5, lines 11-13).");

using the predetermined input noise table(fig. 2A ,num. 38 classifies devices by a particular default class at numeral 40 of fig. 2A at col. 9, lines 2-6.) to generate the noise metric for an image captured by the specific process.

Regarding claim 18, Reuman discloses the method claimed in claim 16, wherein the image capture process is an image scanning process employing a particular film scanner ("scanner class" at col. 9, line 5).

Regarding claim 19, Reuman discloses the method claimed in claim 16, wherein the image capture process employs a particular digital camera ("camera class" at col. 9, line 5.).

Regarding claim 20, Reuman discloses the method claimed in claim 1, further comprising the step of using the noise metric to estimate the image quality. Reuman states," Values must be estimated for the unknown or incomplete spatial information so that the reproduced image will vary as little as possible from the original image (col. 3, lines 7-9.) ."

Regarding claims 21-26, Reuman discloses the method claimed in claim 4, wherein the image rendering step is a photographic printing step (Fig. 5, num. 312 is a printer of Reuman's system). Reuman does not specify the type of printer; however, Reuman states that any type image acquisition device can be used at col. 5, lines 27,28). Therefore, any image from the generic printer of Reuman can be used.

Regarding claim 27, Reuman discloses the method claimed in claim 1, wherein the image ("subject image" in col. 4, line 26.) is an output image (Figure 1 outputs the subject image in col. 4, lines 60-62), the noise table ("generation of look-up tables [or LUT] of noise" at col. 4, lines 18-26 and shown in fig. 2A, num. 36:FORM LUT Ly BY INTERPOLATION.) is an output noise table (Fig. 2A, num. 36 outputs a LUT to numeral 38: DEVICE CLASS KNOWN?.), and the noise metric ("updated spatial device profile" for a particular image acquisition device at col. 5, lines 53-58 and shown in figure 1, num. 12: UPDATE THE SELCTED DEFAULT INFORMATION. Note that the updated spatial device profile or "tags" in col. 5, lines 53,54,58 and 59 includes noise information.) is an output noise metric (The updated spatial device profile is outputted from fig. 1, num. 12: UPDATE THE SELCTED DEFAULT INFORMATION to num. 14:END.).

Regarding claim 28, Reuman discloses the method claimed in claim 1, further comprising the step of predicting the appearance of noisiness of an image ("estimating" noise of an image in col. 4, lines 34,35.) as seen by a human observer (Figure 1, num. 12: UPDATE THE SELCTED DEFAULT INFORMATION uses the tags that include noise information queries in col. 5, line 39 such as "was the image previously sharpened... [and resized]" in col. 5, lines 44-46 as seen or "known" in col. 5, line 39-41 by a "user" in col. 5, line 43.). using the noise metric ("updated spatial device profile" for a particular image acquisition device at col. 5, lines 53-58 and shown in figure 1, num. 12: UPDATE THE SELCTED DEFAULT INFORMATION. Note that the updated spatial device profile or "tags" in col. 5, lines 53,54,58 and 59 includes noise information.) from the noise table ("generation of look-up tables [or LUT] of noise" at col. 4, lines 18-26 and shown in fig. 2A, num. 36:FORM LUT Ly BY INTERPOLATION. Note that the process of fig. 2A, num. 36 is shown in figure 1, num. 10:GENERATE IMAGE NOISE CHARACTERISTICS FROM USER KNOWLEDGE AND IMAGE DATA. Thus the noise metric in generated in figure 1, num. 12 is from the noise table in fig. 1, num. 10.)

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reuman (US Patent 6,069,982 A) and in view of Baba et al. (US Patent 4,804,831 A).

Regarding claim 13, Reuman teaches all the elements of claim 13 except for requiring a logarithm.

Regarding claim 15, Reuman teaches the method claimed in claim 14, further including the step of taking the integration or summation to obtain the noise metric.

However, Reuman does not teach using a logarithm as required of claim 15.

However, Baba et al. does teach the use of a logarithm of a difference formula "ΔI" of luminance at col. 6, line 60 and col. 7, lines18-24.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify Reuman's formula or peak value with Baba et al.'s formula, because Baba et al.'s use of a logarithm can remove errors due to noise in an image by adjusting the characteristic of the logarithm at col. 7, lines 9-24.

8. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Reuman (US Patent 6,069,982 A) and in view of May (US Patent 6,067,125 A).

Regarding claim 17, Reuman discloses the method claimed in claim 16, wherein the image capture process is a photographic process ('video camcorder" col. 5, lines 42,43 or "camera class" at col. 9, line 5).

Reuman does not teach the use of a particular film, but Reuman does teach that any type of image acquisition device can be used at col. 5, lines 27,28.

However, May, in the field of endeavor of noise reduction, does teach the use of a particular film ("film source, such as a motion picture (col. 1, lines 55-57).").

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify Reuman's image acquisition with May's film because "Film grain noise...is part of the "film look" that most people desire...(May, col. 1, lines 57-61).").

9. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Reuman (US Patent 6,069,982) in view of Savakis et al. (US Patent 6,738,494 B1).

Regarding claim 29, Reuman teaches sorting images (Fig. 1, num. 2: FULL KNOWLEDGE OF THE IMAGE NOISE CHARACTERISTICS? is a step that sorts images of the corresponding YES or NO branches of fig. 2, num. 2.) according to a noise metric (Fig. 1, num. 2:...NOISE CHARACTERICS).

Reuman does not teach sorting images from least to most noisy, but does suggest a noise distribution in col. 4, lines 66,67.

However, Savakis et al., in the field of endeavor of ranking images in col. 1, lines 20,21, does teach a step of sorting images (Digital images are ranked in col. 9, lines 58-60) from least to most noisy (The digital images are ranked from a lower rank to a higher rank in col. 9, line 60) in appearance according to the noise metric (The digital images are ranked based on attributes that have corresponding noise modules in col. 9, lines 41-60.).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify Reuman's teaching of a noise distribution with Savakis's image

ranking, because Savakis's image ranking enhances the reduction of noise in col. 9, lines 58-60.

Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dennis Rosario-Vasquez whose telephone number is 703-305-5431. The examiner can normally be reached on 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Boudreau can be reached on 703-305-4706. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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